Patient Blood Management: success and potential in the future

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Patient Blood Management

Success and Potential in the Future

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Preoperative anemia,[1] exaggerated blood loss,[2] and allogeneic red blood cell (RBC) transfusions[3] are individual and intertwined factors that adversely affect patient outcome. They are modifiable and represent the 3 pillars of patient blood management (PBM)—a comprehensive and interdisciplinary concept that aims at pre-emptively reducing the need for RBC transfusions to improve patient safety and outcome.[4] The 3 pillars of PBM are: treatment of preoperative anemia, reduction of perioperative RBC loss, and optimization of the physiologic anemia tolerance including the use of restrictive transfusion triggers.

Meybohm et al, in this issue of the Journal, show that the implementation of PBM in all surgical disciplines in 4 German University Hospitals is safe and reduces RBC transfusions by 17% and acute renal failure by 30%.[5] It is important to stress that this represents real-life data because all surgical patients were included without any exclusion criteria. Safety, the primary outcome, was assessed as the composite outcome of in-hospital mortality, myocardial infarction, ischemic stroke, acute renal failure, pneumonia, or sepsis. It is highly interesting (Tables 3 and 5 of the paper[5]) that RBC transfusions and the primary outcome progressively decreased the longer PBM had been implemented. I hypothesize that the full benefit of PBM had not yet been achieved 1 to 2 years after PBM implementation because the RBC transfusion rate also progressively decreased over several years after the implementation of a PBM program in Western Australia.[6]

Given the multitude of measures of a comprehensive PBM program, it is not astonishing that some centers did not yet fully succeed in the implementation of certain PBM measures (Fig. 1B of the paper[5]). Particularly well implemented was the emphasis on surgical hemostasis and the point-of-care diagnostic for coagulation monitoring. In contrast, relatively little progress was achieved so far in the extended preoperative diagnostics and treatment of anemia. Consequently, the anemia rate at admission remained high at a staggering 35% and admission hemoglobin concentration remained stable. With unchanged discharge hemoglobin, but reduced RBC transfusions, the perioperative RBC loss must have gone down. The exact reason has not been formally analyzed in this study, but likely represents a reduced surgical blood loss due to improved surgical hemostasis and coagulation monitoring and treatment.

The yet unchanged preoperative anemia rate represents a promising field for future research and unmet PBM potential. Preoperative anemia affects approximately 30% of patients and is associated with increased perioperative mortality (20%–40%), increased morbidity (30%), more RBC transfusions, and prolonged length of hospital stay.[1,7] Anemia treatment is efficacious in orthopedic,[8,9] cardiac,[10] and abdominal surgery,[11,12] not only in reducing RBC transfusions but also in reducing acute kidney injury, infections, and length of hospital stay.[8–12] Why then is preoperative

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anemia treatment not better implemented yet in clinical practice? The most important reasons are that many physicians:

1. insufficiently know the definition of anemia, that is, a hemoglobin <12 g/dL for women and a hemoglobin <13 g/dL for men,
2. do not fully recognize the perioperative burden of even mild anemia, thst is, a hemoglobin of 10 to 12 g/dL for women and a hemoglobin of 10 to 13 g/dL for men,
3. report patients only late to anesthesiologists and therefore there seems to be little time for anemia detection and treatment,
4. perceive anemia treatment to be costly and requiring upfront investment.

In addition, systematic preoperative anemia treatment is indeed logistically demanding in large hospitals.[6] Nevertheless, we are to invest efforts into a better anemia treatment in the future. The Duke Perioperative Enhancement Team recently delineated in detail how to develop and implement a preoperative anemia clinic successfully.[13] In addition to early referral, ''intelligent scheduling systems'' are conceivable. Such systems would allow the scheduling of elective patients for operations with an expected blood loss of more than say 500 mL or a probability of RBC transfusion greater than 10% only if preoperative anemia had been investigated and successfully treated. Preoperative anemia treatment programs thus may finally become standard clinical practice.[6,14]

Unfortunately, the authors did not analyze costs. This is another important aspect for the acceptance of a new treatment paradigm not only for physicians but also for hospital administrators and third-party payers. The authors are encouraged to use their data set for a formal cost analysis because the introduction of PBM programs and PBM measures have been shown to be cost-saving in the past in smaller studies.[13,15–18]

I congratulate the authors of this study and all the participating physicians for their tremendous effort in implementing PBM systematically in their hospitals. They have proven safety and benefits of this concept. The full potential of PBM, however, is certainly larger, and the study clearly highlights areas of future points of action, first of which may be the implementation of structures for systematic preoperative anemia treatment.

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